Journal of MOLECULAR BIOLOGY

EDITOR-IN-CHIEF
J. C. KENDREW

ASSISTANT EDITOR
S. BRENNER

EDITORIAL BOARD
M. L. Birnstiel
J. M. Bishop
C. R. Cantor
L. Caro
G. N. Cohen
D. M. Crothers
W. F. Dove
G. A. Gilbert
W. Gilbert
A. Klug
D. E. Koshland
S. Lowey
D. Nathans
D. C. Phillips
C. M. Radding
F. M. Richards
T. Staehelin
G. M. Tomkins
P. M. B. Walker
S. M. Weissman

QH301
J73

VOLUME 85
5 May 1974 to 5 June 1974

ACADEMIC PRESS
LONDON NEW YORK SAN FRANCISCO

Copyright © 1974, by Academic Press Inc. (London) Ltd.

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

Printed in Great Britain

CONTENTS OF VOLUME 85

Number 1, 5 May 1974

Carlisle, C. H., Palmer, R. A., Mazumdar, S. K., Gorinsky, B. A. and Yeates, D. G. R., The Structure of Ribonuclease at 2·5 Å Resolution . 1

Shenkin, A. and Burdon, R. H., Deoxyadenylate-rich and Deoxyguanylate-rich Regions in Mammalian DNA 19

Chao, J., Chao, L. and Speyer, J. F., Bacteriophage T4 Head Morphogenesis: Host DNA Enzymes affect Frequency of Petite Forms 41

Prakash, L., Stewart, J. W. and Sherman, F., Specific Induction of Transitions and Transversions of G·C Base Pairs by 4-Nitroquinoline-1-oxide in Iso-1-cytochrome *c* Mutants of Yeast 51

Mizobuchi, K. and McCorquodale, D. J., Abortive Infection by Bacteriophage BF23 Due to the Colicin Ib Factor. II. Involvement of Pre-early Proteins 67

Bishop, J. O., Rosbash, M. and Evans, D., Polynucleotide Sequences in Eukaryotic DNA and RNA that form Ribonuclease-resistant Complexes with Polyuridylic Acid 75

Rosbash, M. and Ford, P. J., Polyadenylic Acid-containing RNA in *Xenopus laevis* Oocytes 87

Smith, M. J., Hough, B. R., Chamberlin, M. E. and Davidson, E. H., Repetitive and Non-repetitive Sequence in Sea Urchin Heterogeneous Nuclear RNA 103

Palma, E. L., Perlman, S. M. and Huang, A. S., Ribonucleic Acid Synthesis of Vesicular Stomatitis Virus. VI. Correlation of Defective Particle RNA Synthesis with Standard RNA Replication 127

Lawrence, C. W., Stewart, J. W., Sherman, F. and Christensen, R., Specificity and Frequency of Ultraviolet-induced Reversion of an Iso-1-cytochrome *c* Ochre Mutant in Radiation-sensitive Strains of Yeast 137

Ray, P. N. and Pearson, M. L., Evidence for Post-transcriptional Control of the Morphogenetic Genes of Bacteriophage Lambda 163

LETTERS TO THE EDITOR

ROSSMANN, M. G. and LILJAS, A., Recognition of Structural Domains in Globular Proteins 177

YARIV, J., KALB, A. J. and GIBERMAN, E., A Saccharide Ligand on the Outer Surface of Retinal Rod Disc Membranes 183

INOKUCHI, H., CELIS, J. E. and SMITH, J. D., Mutant Tyrosine Transfer Ribonucleic Acids of *Escherichia coli*: Construction by Recombination of a Double Mutant A1G82 Chargeable with Glutamine . . . 187

ANNOUNCEMENT 193

NUMBER 2, 15 MAY 1974

SABORIO, J. L., PONG, S.-S. and KOCH, G., Selective and Reversible Inhibition of Initiation of Protein Synthesis in Mammalian Cells 195

MAZUMDAR, S. K., SAENGER, W. and SCHEIT, K. H., Molecular Structure of Poly-2-thiouridylic Acid, a Double Helix with Non-equivalent Polynucleotide Chains 213

JOBE, A., SADLER, J. R. and BOURGEOIS, S., *lac* Repressor–Operator Interaction. IX. The Binding of *lac* Repressor to Operators Containing O^c Mutations . 231

RANCK, J. L., MATEU, L., SADLER, D. M., TARDIEU, A., GULIK-KRZYWICKI, T. and LUZZATI, V., Order–Disorder Conformational Transitions of the Hydrocarbon Chains of Lipids 249

CARON, F., MATEU, L., RIGNY, P. and AZERAD, R., Chain Motions in Lipid–Water and Protein–Lipid–Water Phases: A Spin-label and X-ray Diffraction Study 279

Appendix 298

INO, I. and YOURNO, J., X-ray Mutagenesis: Base-pair Deletion at a Frameshift Hotspot in *Salmonella* 301

MARINUS, M. G. and MORRIS, N. R., Biological Function for 6-Methyladenine Residues in the DNA of *Escherichia coli* K12 309

YAJKO, D. M., VALENTINE, M. C. and WEISS, B., Mutants of *Escherichia coli* with Altered Deoxyribonucleases. II. Isolation and Characterization of Mutants for Exonuclease I 323

NUMBER 3, 25 MAY 1974

HARTMAN, N. and ZINDER, N. D., The Effect of B Specific Restriction and Modification of DNA on Linkage Relationships in f1 Bacteriophage. I. Studies on the Mechanism of B Restriction *in vivo* 345

HARTMAN, N. and ZINDER N. D., The Effect of B Specific Restriction and Modification of DNA on Linkage Relationships in f1 Bacteriophage. II. Evidence for a Heteroduplex Intermediate in f1 Recombination . 357

CARBON, J. and FLECK, E. W., Genetic Alteration of Structure and Function in Glycine Transfer RNA of *Escherichia coli*: Mechanism of Suppression of the Tryptophan Synthetase A78 Mutation 371

LAZOWSKA, J., MICHEL, F., FAYE, G., FUKUHARA, H. and SLONIMSKI, P. P., Physical and Genetic Organization of *Petite* and *Grande* Yeast Mitochondrial DNA. II. DNA–DNA Hybridization Studies and Buoyant Density Determinations 393

MICHEL, F., LAZOWSKA, J., FAYE, G., FUKUHARA, H. and SLONIMSKI, P. P., Physical and Genetic Organization of *Petite* and *Grande* Yeast Mitochondrial DNA. III. High Resolution Melting and Reassociation Studies . . 411

ENGLAND, J. M. and ATTARDI, G., Expression of the Mitochondrial Genome in HeLa Cells. XXI. Mitochondrial Protein Synthesis During the Cell Cycle 433

HENIKOFF, S., HEYWOOD, J. and MESELSON, M., Orientation of Repeating Units in *Xenopus* Chromosomal Ribosomal DNA: A Test of a Stochastic Model for Maintaining Intraspecies Homogeneity 445

BRANDHORST, B. P. and MCCONKEY, E. H., Stability of Nuclear RNA in Mammalian Cells 451

CHAI, T. and FOULDS, J., Demonstration of a Missing Outer Membrane Protein in *tolG* Mutants of *Escherichia coli* 465

NUMBER 4, 5 JUNE 1974

ALLET, B. and SOLEM, R., Separation and Analysis of Promoter Sites in Bacteriophage Lambda DNA by Specific Endonucleases . . . 475

TYE, B.-K., CHAN, R. K. and BOTSTEIN, D., Packaging of an Oversize Transducing Genome by *Salmonella* Phage P22 485

TYE, B.-K., HUBERMAN, J. A. and BOTSTEIN, D., Non-random Circular Permutation of Phage P22 DNA 501

Appendix—Young, I. T., Levinstone, D., Eden, M., Tye, B.-K. and Botstein, D., Alignment of Partial Denaturation Maps of Circularly Permuted DNA by Computer 528

Pooley, A. S., Pardon, J. F. and Richards, B. M., The Relation Between the Unit Thread of Chromosomes and Isolated Nucleohistone 533

Leamnson, R. N. and Reichmann, M. E., The RNA of Defective Vesicular Stomatitis Virus Particles in Relation to Viral Cistrons 551

Utermann, G. and Simons, K., Studies on the Amphipathic Nature of the Membrane Proteins in Semliki Forest Virus 569

Wilcox, G., Clemetson, K. J., Cleary, P. and Englesberg, E., Interaction of the Regulatory Gene Product with the Operator Site in the L-Arabinose Operon of *Escherichia coli* 589

Shinitzky, M. and Inbar, M., Difference in Microviscosity Induced by Different Cholesterol Levels in the Surface Membrane Lipid Layer of Normal Lymphocytes and Malignant Lymphoma Cells 603

Pereira, H. G. and Wrigley, N. G., *In vitro* Reconstitution, Hexon Bonding and Handedness of Incomplete Adenovirus Capsid 617

Appendix—Perkins, W. J. and Polihroniadis, P., A Computer Building Program for Biological Structures 630

Gall, J. G. and Atherton, D. D., Satellite DNA Sequences in *Drosophila virilis* 633

Appendix—How many Repeating DNAs are possible? 658

Gray, D. M. and Gall, J. G., The Circular Dichroism of Three *Drosophila virilis* Satellite DNAs 665

Appendix—The Circular Dichroism of a *Drosophila melanogaster* Satellite DNA 677

Index to Volume 85

Adenovirus capsid, incomplete, *in vitro* reconstitution, hexon bonding and handedness, 617
Allet, B. & Solem, R., Separation and analysis of promoter sites in bacteriophage lambda DNA by specific endonucleases, 475
Amphipathic nature of the membrane proteins in Semliki Forest virus, 569
Atherton, D. D. (see also Gall, J. G.), 633, 658
Attardi, G. (see also England, J. M.), 433
Azerad, R. (see also Caron, F.), 279

B-restriction mechanism *in vivo* in f1 recombination, 345
B-specific restriction and modification of DNA, effects on linkage relationships in f1 bacteriophage, 345, 357
Bacteriophage BF23, abortive infection due to the colicin Ib factor; involvement of pre-early proteins. 67
— f1, effect of B-specific restriction and modification of DNA on linkage relationships, 345, 357
— λDNA, separation and analysis of promoter sites by specific endonucleases, 475
— —, evidence for post-transcriptional control of the morphogenetic genes, 163
— P22 DNA, non-random circular permutation, 501
— — of *Salmonella*, packaging of an oversize transducing genome, 485
— T4 head morphogenesis: host DNA enzymes affect frequency of petite forms, 41
Base-pair deletion at a frameshift hotspot in *Salmonella* induced by X-rays, 301
BF23 (see Bacteriophage), 67
Biological function for 6-methyladenine residues in the DNA of *Escherichia coli* K12, 309
Bishop, J. O., Rosbash, M. & Evans, D., Polynucleotide sequences in eukaryotic DNA and RNA that form ribonuclease-resistant complexes with polyuridylic acid, 75
Botstein, D. (see also Tye, B.-K.), 485, 501
— (see also Young, I. T.), 528
Bourgeois, S. (see also Jobe, A.), 231
Brandhorst, B. P. & McConkey, E. H., Stability of nuclear RNA in mammalian cells, 451
Buoyant density determinations and DNA–DNA hybridization studies of *petite* and *grande* yeast mitochondrial DNA, 393
Burdon, R. H. (see also Shenkin, A.), 19

Capsid, adenovirus, incomplete, *in vitro* reconstitution, hexon bonding and handedness, 617
Carbon, J. & Fleck, E. W., Genetic alteration of structure and function in glycine transfer RNA of *Escherichia coli*: mechanism of suppression of the tryptophan synthetase A78 mutation, 371
Carlisle, C. H., Palmer, R. A., Mazumdar, S. K., Gorinsky, B. A. & Yeates, D. G. R., The structure of ribonuclease at 2·5 Å resolution, 1
Caron, F., Mateu, L., Rigny, P. & Azerad, R., Chain motions in lipid–water and protein–lipid–water phases: a spin-label and X-ray diffraction study, 279
Celis, J. E. (see also Inokuchi, H.), 187
Chai, T. & Foulds, J., Demonstration of a missing outer membrane protein in *tolG* mutants of *Escherichia coli*, 465
Chain motions in lipid–water and protein–lipid–water phases, spin-label and X-ray diffraction study, 279
Chan, R. K. (see also Tye, B.-K.), 485
Chamberlin, M. E. (see also Smith, M. J.), 103
Chao, J., Chao, L. & Speyer, J. F., Bacteriophage T4 head morphogenesis: host DNA enzymes affect frequency of petite forms, 41
Chao, L. (see also Chao, J.), 41
Cholesterol levels, effect on microviscosity in the surface membrane lipid layer of normal lymphocytes and malignant lymphoma cells, 603
Christensen, R. (see also Lawrence, C. W.), 137

Circular dichroism of a *Drosophila melanogaster* satellite DNA, 677
— — — three *Drosophila virilis* satellite DNAs, 665
— permutation, non-random, of phage P22 DNA, 501
Circularly permuted DNA, alignment of partial denaturation maps by computer, 528
Cistrons, viral, relation to RNA of defective vesicular stomatitis virus particles, 551
Cleary, P. (see also Wilcox, G.), 589
Clemetson, K. J. (see also Wilcox, G.), 589
Colicin Ib factor, involvement of pre-early proteins in abortive infection by bacteriophage BF23, 67
Computer building program for biological structures, used in simulation of adenovirus capsid, 630
Conformational order–disorder transitions of the hydrocarbon chains of lipids, 249

Davidson, E. H. (see also Smith, M. J.), 103
Defective particle RNA synthesis, correlation with standard RNA replication for vesicular stomatitis virus, 127
Denaturation, partial, maps of circularly permuted DNA, alignment by computer, 528
Deoxyadenylate-rich and deoxyguanylate-rich regions in mammalian DNA, 19
Deoxyribonucleases, altered, in mutants of *Escherichia coli*; isolation and characterization of mutants for exonuclease I, 323
Deoxyribonucleic acid, biological function for 6-methyladenine residues in the DNA of *Escherichia coli* K12, 309
— —, circularly permuted, alignment of partial denaturation maps by computer, 528
— — –DNA hybridization studies and buoyant density determinations of *petite* and *grande* yeast mitochondrial DNA, 393
— —, effect of host enzymes on *petite* forms in bacteriophage T4 head morphogenesis, 41
— —, mammalian, deoxyadenylate-rich and deoxyguanylate-rich regions, 19
— —, mitochondrial, *petite* and *grande*, of yeast, physical and genetic organization, 393, 411
— — modification and B-specific restriction, effects on linkage relationships in f1 bacteriophage, 345, 357
— — of bacteriophage λ, separation and analysis of promoter sites by specific endonucleases, 475
— — of phage P22, non-random circular permutation, 501
— —, orientation of repeating units in *Xenopus* chromosomal ribosomal DNA; test of a stochastic model for maintaining intraspecies homogeneity, 445
— —, polynucleotide sequences in eukaryotic DNA and RNA that form ribonuclease-resistant complexes with polyuridylic acid, 75
— —, satellite, of *Drosophila melanogaster*, circular dichroism, 677
— —, — — — *virilis*, circular dichroism, 665
— — — sequences in *Drosophila virilis*, 633
Deoxyribonucleic acids, repeating, number possible, 658
DI particles (see Vesicular stomatitis), 551
Double helix with non-equivalent polynucleotide chains, molecular structure of poly-2-thiouridylic acid, 213
Drosophila melanogaster satellite DNA, circular dichroism, 677
— *virilis* satellite DNAs, circular dichroism, 665
— — — DNA sequences, 633

Eden, M. (see also Young, I. T.), 528
Endonucleases, specific, use in separation and analysis of promoter sites in bacteriophage λ DNA, 475
England, J. M. & Attardi, G., Expression of the mitochondrial genome in HeLa cells. XXI. Mitochondrial protein synthesis during the cell cycle, 433
Englesberg, E. (see also Wilcox, G.), 589
Escherichia coli, genetic alteration of structure and function in glycine tRNA; mechanism of suppression of the tryptophan synthetase A78 mutation, 371
— — K12, biological function for 6-methyladenine residues in DNA, 309
— — L-arabinose operon, interaction of the regulatory gene product with the operator site, 589
— —, mutant tyrosine tRNA, construction by recombination of a double mutant A1G82 chargeable with glutamine, 187
— — mutants with altered deoxyribonucleases; isolation and characterization of mutants for exonuclease I, 323

Escherichia coli, tolG mutants, demonstration of a missing outer membrane protein, 465
Evans, D. (see also Bishop, J. O.), 75
Exonuclease I mutants of *Escherichia coli*, isolation and characterization, 323

f1 (see Bacteriophage), 345, 357
Faye, G. (see also Lazowska, J.), 393
— (see also Michel, F.), 411
Fleck, E. W. (see also Carbon, J.), 371
Ford, P. J. (see also Rosbash, M.), 87
Foulds, J. (see also Chai, T.), 465
Frameshift hotspot in *Salmonella*, base-pair deletion induced by X-rays, 301
Fukuhara, H. (see also Lazowska, J.), 393
— (see also Michel, F.), 411

Gall, J. G. & Atherton, D. D., *Appendix*—How many repeating DNAs are possible?, 658
— —, Satellite DNA sequences in *Drosophila virilis*, 633
— (see also Gray, D. M.), 665, 677
G·C base pairs, specific induction of transitions and transversions by 4-nitroquinoline-1-oxide in iso-1-cytochrome *c* mutants of yeast, 51
Genetic alteration of structure and function in glycine tRNA of *Escherichia coli*; mechanism of suppression of the tryptophan synthetase A78 mutation, 371
Giberman, E. (see also Yariv, J.), 183
Globular proteins, recognition of structural domains, 177
Glycine tRNA of *Escherichia coli*, genetic alteration of structure and function; mechanism of suppression of the tryptophan synthetase A78 mutation, 371
Gorinsky, B. A. (see also Carlisle, C. H.), 1
Gray, D. M. & Gall, J. G., *Appendix*—The circular dichroism of a *Drosophila melanogaster*, satellite DNA, 677
— —, The circular dichroism of three *Drosophila virilis* satellite DNAs, 665
Gulik-Krzywicki, T. (see also Ranck, J. L.), 249

Handedness and hexon bonding of incomplete adenovirus capsid reconstituted *in vitro*, 617
Hartman, N. & Zinder, N. D., The effect of B-specific restriction and modification of DNA on linkage relationships in f1 bacteriophage. I. Studies on the mechanism of B restriction *in vivo*, 345
— —, — — — — — — — — — — — — — — — —. II. Evidence for a heteroduplex intermediate in f1 recombination, 357
Head morphogenesis in bacteriophage T4, effect of host DNA enzymes on frequency of petite forms, 41
HeLa cells, mitochondrial protein synthesis during the cell cycle, 433
Henikoff, S., Heywood, J. & Meselson, M., Orientation of repeating units in *Xenopus* chromosomal ribosomal DNA: A test of a stochastic model for maintaining intraspecies homogeneity, 445
Heteroduplex intermediate in f1 recombination, 357
Hexon bonding and handedness of incomplete adenovirus capsid reconstituted *in vitro*, 617
Heywood, J. (see also Henikoff, S.), 445
Hough, B. R. (see also Smith, M. J.), 103
Huang, A. S. (see also Palma, E. L.), 127
Huberman, J. A. (see also Tye, B.-K.), 501
Hybridization, DNA–DNA, studies and buoyant density determinations of *petite* and *grande* yeast mitochondrial DNA, 393

Inbar, M. (see also Shinitzky, M.), 603
Inhibition, selective and reversible, of initiation of protein synthesis in mammalian cells, 195
Ino, I. & Yourno, J., X-ray mutagenesis: base-pair deletion at a frameshift hotspot in *Salmonella*, 301

Inokuchi, H., Celis, J. E. & Smith, J. D., Mutant tyrosine transfer ribonucleic acids of *Escherichia coli*: construction by recombination of a double mutant A1G82 chargeable with glutamine, 187
Intraspecies homogeneity of repeated DNA sequences, test of a stochastic model, 445
Iso-1-cytochrome *c* mutants of yeast, specific induction of transitions and transversions of G·C base-pairs by 4-nitroquinoline-1-oxide, 51
— — ochre mutant in radiation-sensitive strains of yeast, specificity and frequency of ultraviolet-induced reversion, 137

Jobe, A., Sadler, J. R. & Bourgeois, S., *lac* repressor–operator interaction. IX. The binding of *lac* repressor to operators containing O^c mutations, 231

K12 (see *Escherichia coli*), 309
Kalb, A. J. (see also Yariv, J.), 183
Koch, G. (see also Saborio, J. L.), 195

λ (see Bacteriophage), 163, 475
lac repressor binding to operators containing O^c mutations, 231
L-Arabinose operon of *Escherichia coli*, interaction of the regulatory gene product with the operator site, 589
Lawrence, C. W., Stewart, J. W., Sherman, F. & Christensen, R., Specificity and frequency of ultraviolet-induced reversion of an iso-1-cytochrome *c* ochre mutant in radiation-sensitive strains of yeast, 137
Lazowska, J., Michel, F., Faye, G., Fukuhara, H. & Slonimski, P. P., Physical and genetic organization of *petite* and *grande* yeast mitochondrial DNA. II. DNA–DNA hybridization studies and buoyant density determinations, 393
— (see also Michel, F.), 411
Leamnson, R. N. & Reichmann, M. E., The RNA of defective vesicular stomatitis virus particles in relation to viral cistrons, 551
Levinstone, D. (see also Young, I. T.), 528
Liljas, A. (see also Rossmann, M. G.), 177
Linkage relationships in f1 bacteriophage, effects of B-specific restriction and modification of DNA, 345, 357
Lipid layer of surface membrane of normal lymphocytes and malignant lymphoma cells, difference in microviscosity induced by different cholesterol levels, 603
Lipids, order–disorder conformational transitions of hydrocarbon chains, 249
Lipid–water and protein–lipid–water phases, chain motions studied by spin-labelling and X-ray diffraction, 279
Luzzati, V. (see also Ranck, J. L.), 249
Lymphocytes, normal, and malignant lymphoma cells, difference in microviscosity induced by different cholesterol levels in the surface membrane lipid layer, 603
Lymphoma cells, malignant, and normal lymphocytes, difference in microviscosity induced by different cholesterol levels in the surface membrane lipid layer, 603

Mammalian cells, selective and reversible inhibition of protein synthesis, 195
— —, stability of nuclear RNA, 451
— DNA, deoxyadenylate-rich and deoxyguanylate-rich regions, 19
Map alignment by computer, partial denaturation maps of circularly permuted DNA, 528
Marinus, M. G. & Morris, N. R., Biological function for 6-methyladenine residues in the DNA of *Escherichia coli* K12, 309
Mateu, L. (see also Caron, F.), 279
— (see also Ranck, J. L.), 249

Mazumdar, S. K., Saenger, W. & Scheit, K. H., Molecular structure of poly-2-thiouridylic acid, a double helix with non-equivalent polynucleotide chains, 213
— (see also Carlisle, C. H.), 1
McConkey, E. H. (see also Brandhurst, B. P.), 451
McCorquodale, D. J. (see also Mizobuchi, K.), 67
Melting, high resolution, and reassociation studies of *petite* and *grande* yeast mitochondrial DNA, 411
Membrane proteins in Semliki Forest virus, studies on amphipathic nature, 569
Meselson, M. (see also Henikoff, S.), 445
6-Methyladenine residues in the DNA of *Escherichia coli* K12, biological function, 309
Michel, F., Lazowska, J., Faye, G., Fukuhara, H. & Slonimski, P. P., Physical and genetic organization of *petite* and *grande* yeast mitochondrial DNA. III. High-resolution melting and reassociation studies, 411
— (see also Lazowska, J.), 393
Microviscosity differences induced by different cholesterol levels in the surface membrane lipid layer of normal lymphocytes and malignant lymphoma cells, 603
Mitochondrial DNA, *petite* and *grande*, of yeast, physical and genetic organization, 393, 411
— protein synthesis during the cell cycle in HeLa cells, 433
Mizobuchi, K. & McCorquodale, D. J., Abortive infection by bacteriophage BF23 due to the colicin Ib factor. II. Involvement of pre-early proteins, 67
Morphogenetic genes of bacteriophage lambda, evidence for post-transcriptional control, 163
Morris, N. R. (see also Marinus, M. G.), 309
Mutant tyrosine tRNA of *Escherichia coli*, construction by recombination of a double mutant A1G82 chargeable with glutamine, 187

4-Nitroquinoline-1-oxide, specific induction of transitions and transversions of G·C base-pairs in iso-1-cytochrome *c* mutants of yeast, 51
Nuclear RNA, stability in mammalian cells, 451
Nucleohistone, isolated, relation to unit thread of chromosomes, 533

Oocytes of *Xenopus laevis*, polyadenylic acid-containing RNA content, 87
Operator–repressor interaction, binding of *lac* repressor to operators containing O^c mutations, 231
— site, interaction with the regulatory gene product in the L-arabinose operon of *Escherichia coli*, 589
Order–disorder conformational transitions of the hydrocarbon chains of lipids, 249
Orientation of repeating units in *Xenopus* chromosomal ribosomal DNA; test of a stochastic model for maintaining intraspecies homogeneity, 445
Outer membrane protein missing in *tolG* mutants of *Escherichia coli*, 465

P22 (see Bacteriophage), 485, 501
Palma, E. L., Perlman, S. M. & Huang, A. S., Ribonucleic acid synthesis of vesicular stomatitis virus. VI. Correlation of defective particle RNA synthesis with standard RNA replication, 127
Palmer, R. A. (see also Carlisle, C. H.), 1
Pardon, J. F. (see also Pooley, A. S.), 533
Pearson, M. L. (see also Ray, P. N.), 163
Pereira, H. G. & Wrigley, N. G., *In vitro* reconstitution, hexon bonding and handedness of incomplete adenovirus capsid, 617 (see also Perkins, W. J., *Appendix*, 630)
Perkins, W. J. & Polihroniadis, P., A computer building program for biological structures, 630 (*Appendix* to Pereira, H. G., 617)
Perlman, S. M. (see also Palma, E. L.), 127
Petite bacteriophage T4 particles, effect of host DNA enzymes on frequency, 41
Polihroniadis, P. (see also Perkins, W. J.), 630
Polyadenylic acid-containing RNA in *Xenopus laevis* oocytes, 87
Polynucleotide chains, non-equivalent, of double helix molecular structure of poly-2-thiouridylic acid, 213
— sequences in eukaryotic DNA and RNA that form ribonuclease-resistant complexes with polyuridylic acid, 75

Poly-2-thiouridylic acid, molecular structure, double helix with non-equivalent polynucleotide chains, 213
Polyuridylic acid, formation of ribonuclease-resistant complexes with polynucleotide sequences in eukaryotic DNA and RNA, 75
Pong, S.-S. (see also Saborio, J. L.), 195
Pooley, A. S., Pardon, J. F. & Richards, B. M., The relation between the unit thread of chromosomes and isolated nucleohistone, 533
Prakash, L., Stewart, J. W. & Sherman, F., Specific induction of transitions and transversions of G·C base pairs by 4-nitroquinoline-1-oxide in iso-1-cytochrome *c* mutants of yeast, 51
Promoter site separation and analysis in bacteriophage λ DNA by specific endonucleases, 475
Protein–lipid–water and lipid–water phases, chain motions studied by spin-labelling and X-ray diffraction, 279
Proteins, pre-early, involvement in abortive infection by bacteriophage BF23 due to the colicin Ib factor, 67

Ranck, J. L., Mateu, L., Sadler, D. M., Tardieu, A., Gulik-Krzywicki, T. & Luzzati, V., Order–disorder conformational transitions of the hydrocarbon chains of lipids, 249
Ray, P. N. & Pearson, M. L., Evidence for post-transcriptional control of the morphogenetic genes of bacteriophage lambda, 163
Reassociation and high-resolution melting studies of *petite* and *grande* yeast mitochondrial DNA, 411
Reconstitution *in vitro*, hexon bonding and handedness of incomplete adenovirus capsid, 617
Regulatory gene product, interaction with the operator site in the L-arabinose operon of *Escherichia coli*, 589
Reichmann, M. E. (see also Leamnson, R. N.), 551
Repeating DNAs, number possible, 658
Repetitive and non-repetitive sequence in sea urchin heterogeneous nuclear RNA, 103
Repressor–operator interaction, binding of *lac* repressor to operators containing O^c mutations, 231
Retinal rod disc membranes, saccharide ligand on the outer surface, 183
Ribonuclease, structure at 2·5 Å resolution, 1
Ribonuclease-resistant complexes, formation with polyuridylic acid and polynucleotide sequences in eukaryotic DNA and RNA, 75
Ribonucleic acid, glycine tRNA of *Escherichia coli*, genetic alteration of structure and function; mechanism of suppression of the tryptophan synthetase A78 mutation, 371
— —, heterogeneous nuclear, repetitive and non-repetitive sequence in sea urchin, 103
— —, mutant tyrosine tRNA of *Escherichia coli*, construction by recombination of a double mutant A1G82 chargeable with glutamine, 187
— —, nuclear, stability in mammalian cells, 451
— — of defective vesicular stomatitis virus particles in relation to viral cistrons, 551
— —, polyadenylic acid-containing, in *Xenopus laevis* oocytes, 87
— —, polynucleotide sequences in eukaryotic DNA and RNA that form ribonuclease-resistant complexes with polyuridylic acid, 75
— — synthesis of vesicular stomatitis virus, correlation of defective particle RNA synthesis with standard RNA replication, 127
Richards, B. M. (see also Pooley, A. S.), 533
Rigny, P. (see also Caron, F.), 279
Rosbash, M. & Ford, P. J., Polyadenylic acid-containing RNA in *Xenopus laevis* oocytes, 87
— (see also Bishop, J. O.), 75
Rossmann, M. G. & Liljas, A., Recognition of structural domains in globular proteins, 177

Saborio, J. L., Pong, S.-S. & Koch, G., Selective and reversible inhibition of initiation of protein synthesis in mammalian cells, 195
Saccharide ligand on the outer surface of retinal rod disc membranes, 183
Sadler, D. M. (see also Ranck, J. L.), 249
Sadler, J. R. (see also Jobe, A.), 231
Saenger, W. (see also Mazumdar, S. K.), 213
Salmonella, base-pair deletion at a frameshift hotspot induced by X-rays, 301
— phage P22, packaging of an oversize transducing genome, 485
Satellite DNA of *Drosophila melanogaster*, circular dichroism, 677
— — sequences in *Drosophila virilis*, 633
— DNAs of *Drosophila virilis*, circular dichroism, 665

Scheit, K. H. (see also Mazumdar, S. K.), 213
Sea urchin heterogeneous nuclear RNA, repetitive and non-repetitive sequence, 103
Semliki Forest virus, studies on the amphipathic nature of the membrane proteins, 569
Sequences in satellite DNA of *Drosophila virilis*, 633
Shenkin, A. & Burdon, R. H., Deoxyadenylate-rich and deoxyguanylate-rich regions in mammalian DNA, 19
Sherman, F. (see also Lawrence, C. W.), 137
— (see also Prakash, L.), 51
Shinitzky, M. & Inbar, M., Difference in microviscosity induced by different cholesterol levels in the surface membrane lipid layer of normal lymphocytes and malignant lymphoma cells, 603
Simons, K. (see also Utermann, G.), 569
Slonimski, P. P. (see also Lazowska, J.), 393
— (see also Michel, F.), 411
Smith, J. D. (see also Inokuchi, H.), 187
Smith, M. J., Hough, B. R., Chamberlin, M. E. & Davidson, E. H., Repetitive and non-repetitive sequence in sea urchin heterogeneous nuclear RNA, 103
Solem, R. (see also Allet, B.), 475
Speyer, J. F. (see also Chao, J.), 41
Spin-label and X-ray diffraction study of chain motions in lipid–water and protein–lipid–water phases, 279
Stability of nuclear RNA in mammalian cells, 451
Stewart, J. W. (see also Lawrence, C. W.), 137
— (see also Prakash, L.), 51
Structural domains, recognition in globular proteins, 177
Synthesis of protein in mammalian cells, selective and reversible inhibition of initiation, 195

T4 (see Bacteriophage), 41
Tardieu, A. (see also Ranck, J. L.), 249
tolG mutants of *Escherichia coli*, demonstration of a missing outer membrane protein, 465
Transcription: evidence for post-transcriptional control of the morphogenetic genes of bacteriophage lambda, 163
Transducing genome, oversize, packaging by *Salmonella* phage P22, 485
Tryptophan synthetase A78 mutation suppression mechanism; genetic alteration of structure and function in glycine tRNA of *Escherichia coli*, 371
Tye, B.-K., Chan, R. K. & Botstein, D., Packaging of an oversize transducing genome by *Salmonella* phage P22, 485
—, Huberman, J. A. & Botstein, D., Non-random circular permutation of phage P22 DNA, 501 (see also Young, I. T., *Appendix*, 528)
— (see also Young, I. T.), 528
Tyrosine tRNA mutant of *Escherichia coli*, construction by recombination of a double mutant A1G82 chargeable with glutamine, 187

Ultraviolet-induced reversion of an iso-1-cytochrome *c* ochre mutant in radiation-sensitive strains of yeast: specificity and frequency, 137
Utermann, G. & Simons, K., Studies on the amphipathic nature of the membrane proteins in Semliki Forest virus, 569

Valentine, M. C. (see also Yajko, D. M.), 323
Vesicular stomatitis (see Virus), 127, 551
Virus, Semliki Forest, studies on the amphipathic nature of the membrane proteins, 569
—, vesicular stomatitis, correlation of defective particle RNA synthesis with standard RNA replication, 127
— — —, RNA of defective particles in relation to viral cistrons, 551

Weiss, B. (see also Yajko, D. M.), 323
Wilcox, G., Clemetson, K. J., Cleary, P. & Englesberg, E., Interaction of the regulatory gene product with the operator site in the L-arabinose operon of *Escherichia coli*, 589
Wrigley, N. G. (see also Pereira, H. G.), 617

Xenopus chromosomal ribosomal DNA, orientation of repeating units; test of a stochastic model for maintaining intraspecies homogeneity, 445
— *laevis* oocytes, polyadenylic acid-containing RNA content, 87
X-ray diffraction and spin-label study of chain motions in lipid–water and protein–lipid–water phases, 279
— mutagenesis, base-pair deletion at a frameshift hotspot in *Salmonella*, 301

Yajko, D. M., Valentine, M. C. & Weiss, B., Mutants of *Escherichia coli* with altered deoxyribonucleases. II. Isolation and characterization of mutants for exonuclease I, 323
Yariv, J., Kalb, A. J. & Giberman, E., A saccharide ligand on the outer surface of retinal rod disc membranes, 183
Yeast *petite* and *grande* mitochondrial DNA, physical and genetic organization, 393, 411
—, radiation-sensitive strains, specificity and frequency of ultraviolet-induced reversion of an iso-1-cytochrome *c* ochre mutant, 137
—, specific induction of transitions and transversions of G·C base-pairs by 4-nitroquinoline-1-oxide in iso-1-cytochrome *c* mutants, 51
Yeates, D. G. R. (see also Carlisle, C. H.), 1
Young, I. T., Levinstone, D., Eden, M., Tye, B.-K. & Botstein, D., Alignment of partial denaturation maps of circularly permuted DNA by computer, 528 (*appendix* to Tye, B.-K., 501)
Yourno, J. (see also Ino, I.), 301

Zinder, N. D. (see also Hartman, N.), 345, 357